THE OHIO NINTH GRADE PROFICIENCY TEST AND A SCHOOL'S CURRICULUM

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Introduction

Ohio's ninth graders did not perform well on the mathematics portion of the November, 1990, administration of the proficiency test. Previous conversations with both administrators and teachers as well as cursory examinations of curricula from more than a dozen school systems led us to speculate that a significant portion of difficulty with proficiency test performance could be attributed to the lack of alignment between the curricula and what is tested. If students have not been taught particular content, then it is certainly unrealistic to expect them to perform well on the proficiency test. Notwithstanding the possibility of negative test-performance effects from other educational as well as extracurricular sources, the lack of fit between the curriculum and the proficiency test is directly under the control of local schools and, hence, can be improved.

This article describes one approach to the problem of test and curriculum mismatch. We used the processes and techniques described below to assist a suburban, lower-middle socio-economic community's school system with assessing moves it could make to improve the median-level test performance which its ninth graders had exhibited for the previous six years. We hope that these quick and uncomplicated techniques are directly applicable or easily modifiable for use in your school.

The Processes

Assessment of the lack of alignment between the proficiency test and the curriculum required data that characterized what was being implemented within the curriculum. Three primary sources for this data were: (1) the textbooks used in grades one through eight; (2) the graded course of study for the school system; and (3) the standardized achievement tests used in grades 4, 6, and 8, as required by Ohio law. For the most part, counting techniques were used to generate data that would ultimately be used in comparative analyses. The design dimensions of the proficiency test provided the basis for these comparisons.

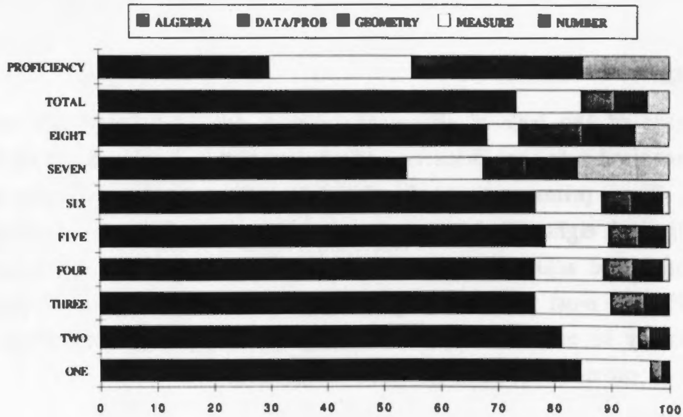
Item specifications for the proficiency test extend across five Content Domains, namely: Number (30%); Measurement (25%); Geometry (15%); Data Analysis & Probability (15%); and Algebra (15%). Item balance with respect to levels of Cognitive Functioning are: Knowledge & Skills (25%); Concepts (25%); and Problem Solving & Applications (50%).

<u>**Textbooks vs. Proficiency Test Comparisons**</u>

We assumed that the content of the textbooks was reliable evidence about what was being taught in most classrooms within the school system, which judgment was concurred with, at different times, by the vast majority of both administrators and teachers within this school system. Each page of the textbook at each grade level was classified and tallied as belonging primarily to one of the five Content Domains. The counting process was accomplished at a comfortable pace; a quick page scan allowed for the judgment of whether that page was primarily concerned with Number, Geometry, or one of the other Content Domains.

Frequencies were entered into a spreadsheet to allow for ready computation of the percent that each text allotted to the five Content Domains and to provide for quick graphs of each grade level contrasted with the proficiency test. Graphs for each grade level and for the summed total of the textbook pages across all eight grade levels are shown in Figure 1. A ponderous, yet perhaps not astonishing, 73% of the total textbook pages for grades one through eight were concerned primarily with Number (that is, computation) which is in stark contrast to the 30% of items classified as Number on the proficiency test.

FIGURE 1. PERCENT OF GRADE LEVEL TEXTS ON EACH PROFICIENCY TEST TOPIC



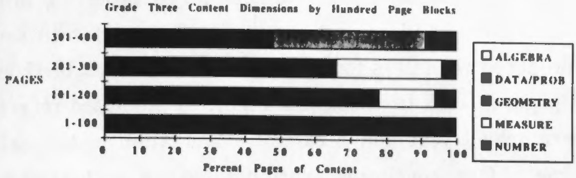
Anticipating that teachers might react by stating that they were unable to teach all of the text because of adjustments necessitated by differing student backgrounds and abilities, and by lost instructional time due to snow days, field trips, etc., we produced the tallies for 100-page blocks of each textbook. The graph of the first 100 pages in each textbook [see Figure 2] prompted reflection about the beginning of each school year and a careful examination of the nature of lessons during that time. Our conclusion, corroborated by a majority of both the elementary and the secondary teachers, was that considerable instructional time was invested in review and remediation (see Flanders, 1987).

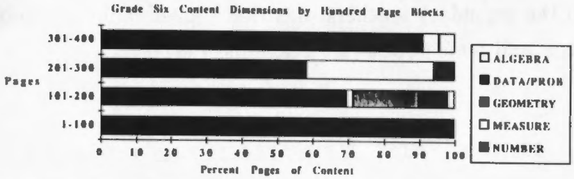
FIGURE 2. PERCENT OF FIRST HUNDRED PAGES ABOUT NUMBER

Examination of the graphs for the total textbook 100-page blocks at each grade level indicated that Content Domains, other than Number, often were found late in the textbooks, and might not be taught at all if a teacher pursued a slower pace to accommodate the unique abilities of the students within that classroom. The graphs of grades three and six, in Figure 3, serve as examples of this curricular obstacle. The straightforward implication is that some students in this school were presumably not establishing sufficient background in the fundamental conceptual areas, outside of computation, on the proficiency test.

The page count information is primary in assessing whether an alignment problem exists between the implemented curriculum and the proficiency test. Such information is essential for effective curricular judgments, yet is easily and economically obtainable.

FIGURE 3. CONTENT BALANCE IN GRADES 3 AND 6





Graded Course of Study vs. Proficiency Test Comparisons

A similar type of counting process was applied to the Pupil Performance Objectives (PPOs) for the school system's Graded Course of Study approved by the local School Board and accepted by the Ohio Department of Education. Objectives were classified and tallied at either the developmental level or the mastery level for each grade level across the five Content Domains.

GRADE	NUMBER	MEASURE	GEOMETRY	DATA/PROB	ALGEBRA
1	7	7	1	1	0
2	4	0	0	0	1
3	0	0	0	0	0
4	1	1	3	0	0
5	5	1	1	0	1
6	6	0	0	2	0
7	5	3	3	0	0
8	2	0	1	0	2
TOTAL	30	12	9	3	4

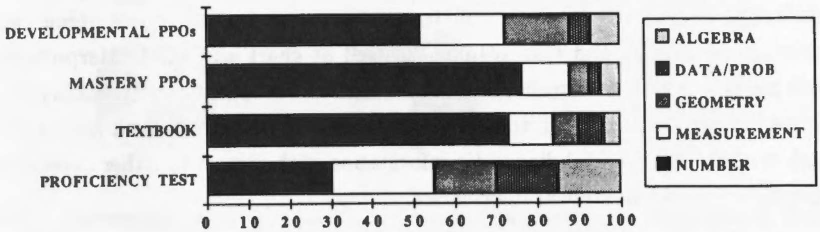
Table 1: Count of Development Level Objectives from Graded Course of Study Classified by Content Type

GRADE	NUMBER	MEASURE	GEOMETRY	DATA/PROB	ALGEBRA
1	0	0	0	0	0
2	1	0	0	0	0
3	11	4	1	1	0
4	0	0	0	0	0
5	2	1	1	0	0
6	2	0	0	0	0
7	8	0	0	0	1
8	8	0	0	0	1
TOTAL	32	5	2	1	2

TABLE 2. COUNT OF MASTERY LEVEL OBJECTIVES FROM GRADED COURSE OF STUDY CLASSIFIED BY CONTENT TYPE.

Tables 1 and 2 display the frequency count of PPOs at each grade level. We recognized a significant correlation between the PPOs dispersal and the above-mentioned textbook data; further, we contrasted the totals across all grade levels with the Content Domains of the proficiency test as shown in Figure 4.

FIGURE 4. BALANCE ACROSS PPOs, TEXT PAGES, AND PROFICIENCY TESTS



It should be noted that the process of counting objectives is free of any judgment concerning the quality or the comprehensiveness of the particular PPOs. However, an interesting comparison was established with the Ohio Model Competency-Based Mathematics Program (1990). These <u>same</u> objectives appear earlier, grade-wise, in the count of the Model Curriculum (Table 3), than in either the Developmental count (Table 1) or the Mastery count (Table 2).

GRADE	NUMBER	MEASURE	GEOMETRY	DATA/PROB	ALGEBRA
1	9	5	1	1	1
2	3	2	2	0	0
3	2	2	2	0	0
4	7	0	1	1	1
5	9	2	2	1	0
6	1	0	1	2	0
7	3	0	1	0	2
8	1	0	0	1	4
TOTAL	35	11	10	6	8

Table 3: Count of Objectives from *Ohio Model Competency-Based Mathematics Program* Classified by Content Type per Grade Level.

It should be noted that we have not included any objectives which are in the Model Curriculum and not in this school system's PPO inventory. These data provide support for our contention that considerable instructional time is spent on review and/or remediation as was already evident from the 100-page block data, above.

Standardized Test vs. Proficiency Test Comparisons

A primary policy concern was whether the standardized tests used in grades 4, 6, and 8 were providing diagnostic information relative to the proficiency test that would assist in both curricular planning and identification of individual student's study requirements. Each mathematics test item was classified according to the five Content Domains, once again without regard for item quality. Also tallied were items within a sub-test not considered as mathematical by the test publishers, specifically, the visual thinking sub-test. In our judgment, these items were concerned with graph and map reading, as well as chart and table interpretation, which are both topics within the Content Domain of Data Analysis/Probability. Table 4 indicates a paucity of items from Geometry, Measurement, and Algebra which severely limits useful diagnostic information with respect to either curriculum decisions or individual student deficiencies.

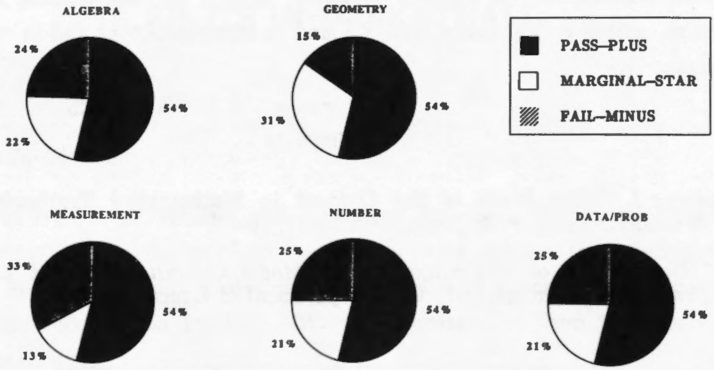
	GRADE 4	GRADE 6	GRADE 8
NUMBER	68%	64%	60%
MEASUREMENT	4%	1%	4%
GEOMETRY	2%	2%	1%
DATA/PROB	23%	29%	30%
ALGEBRA	3%	4%	5%

TABLE 4: Percent of Items of Grade 4, 6, and 8 Standardized Tests about Content of the Proficiency Test

Other Data Incorporated into the Process

Individual 1990 proficiency test results classify each student as passing (+), marginal (*), or failing (–) for each of the five Content Domains. Comparable information across the three levels of Cognitive Functioning is not provided by the Ohio Board of Education to the local school. The 1990 proficiency test results for this school system, depicted in the five circle graphs of Figure 5, afforded interesting grist for the program-assessment mill. Given the amount of instructional time devoted to Number as evidenced above, the percentage of failures within the Number Domain on the proficiency test prompted difficult and probing questions about what had occurred with respect to instruction concerning Number, read computation.

FIGURE 5. SUCCESS RATES FOR EACH CONTENT DOMAIN OF THE PROFICIENCY TEST



Our discussions with the school system representatives highlighted how innovative uses of computation actually can increase instruction time across the neglected Content Domains of Measurement, Algebra, and Data Analysis, and how Number skills actually could help to consolidate problem solving applications. This school system's most immediate conclusion was to increase instructional attention to the Content Domains, other than Number, beginning with students currently in grades 6, 7, and 8. Particular attention was given to Geometry where a large portion of students were classified as marginal on the 1990 proficiency test, and where limited instructional time had been allotted.

Summary

The above processes provide useful information about the curriculum. Data collection is simple and quick since few value judgments are necessary. Extensive and sophisticated statistical methods are not used. Thoughtful and deliberate interpretations are relied upon to specify programmatic needs and to suggest suitable actions.

One obvious extension can be made to improve the process, namely, a determination of the levels of Cognitive Functioning within the textbooks and the standardized tests with subsequent comparisons to those levels as specified by the proficiency test. Another extension might be the gathering of data that provides information about the methods of textbook usage and textbook enrichment by individual teachers.

The proficiency test provides a useful stimulus for change because it represents a better balance and a stronger emphasis among the topics, that is, Content Domains, within mathematics than is found in most textbooks and in many school curricula.

References

Flanders, J. "How Much of the Content in Mathematics Textbooks is New" *Arithmetic Teacher* 35 (September 1987), 18–23.

Ohio Department of Education. *Ohio Model Competency-Based Mathematics Program.* Columbus, OH: Ohio Department of Education, 1990.

From Phi Delta Kappan, October, 1991

"The facts of the school crisis are all out in plain sight and pretty dreadful to look at. First of all, it has been shown that a surprisingly small percentage of high school students is studying what used to be considered basic subjects... People are complaining that the diploma has been devalued to the point of meaninglessness... To revitalize America's educational dream, we must stop kowtowing to the mediocre."

Sloan Wilson
"It's Time to Close our Carnival"
Life, 24 March 1958, pp. 36–7.

From NCTM

"We live in days in which concentration on purely scholastic matters is infinitely more difficult. Throbbing life all about young people pulls the attention away from scholastic activities. Although all this may be true it yet remains that we, the classroom teachers, must take prompt action before the public generally recognizes just what is happening. Confusion may result if society concludes that it is not getting a just return for its huge investment in secondary schools."

Raleigh Schorling, *The First Yearbook*, NCTM, 1926, p. 70.